EMERGENCY OPERATIONS SYSTEMS DEVELOPMENT

RESCUE

SUMMARY OF PHASE I REPORT

Prepared by:

Media Planning & Production, Inc.
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MENLO PARK
CALIFORNIA

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PREFACE

This booklet is a brief summary of one of 11 preliminary reports on the Emergency Operations Systems Development (EOSD) project of the Office of Civil Defense.

The project is being conducted by Stanford Research Institute, under OCD Contract PS-65-62, to develop guidance for emergency operations systems which are integrated with and capable of supporting the shelter-based civil defense program.

The 11 tasks in the EOSD project are:

1. Warning
2. Shelter management
3. Movement to shelter
4. Rescue
5. Law and order
6. Remedial movement
7. Local communications
8. Radiological defense
9. Public works engineering
10. Emergency welfare services
11. Emergency medical services

This summary covers Phase I of the Rescue Task and includes analysis, evaluation of alternative systems, and recommendations. The complete Phase I report has been submitted to the Office of Civil Defense. Phase II will translate the selected system into a program of implementation.

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I INTRODUCTION

Office of Civil Defense progress in developing a civil defense rescue capability has included has a long-term program of building an operational capability and a short history of research.

The rescue program has been managed competently by professionals from police and fire rescue services and the military. While there has been little serious criticism of the program, there has been some concern that is oriented too heavily to World War II concepts of warfare and might not therefore be responsive to the aftermath of a nuclear attack.

Significant contributions include the following:

1. Publication of training manuals for light, heavy, and basic rescue.
2. Publication of limited federal guidance in terms of community organization procedures.
3. Creation of a nationwide rescue organization within the American Legion.
4. Assistance in equipping this organization and various local civil defense agencies and training schools with rescue vehicles and tools.
5. Installation or assistance in the installation of several sites where rescue personnel are trained to work in structurally-damaged buildings.

In 1964, a research program was initiated to search for better

system concepts. The first year of research* produced a preliminary evaluation of the character and magnitude of the problem. This evaluation has been a valuable point of departure for rescue aspects of EOSD planning.

Objectives of this current EOSD task are to:

1. Formulate the magnitude and character of the post-attack nuclear rescue problem.
2. Develop concepts of alternative systems.
3. Estimate the cost and effectiveness of the alternative approaches.
4. Assess the impact of the rescue systems on governments, the military, and related segments of society.

This task study is limited to rescue of persons and vital supplies trapped in nuclear-attack debris. The effects of fire and fallout on such persons are considered in detail and medical needs are indicated.

The analysis was made on the basis of two hypothetical attacks on Atlanta, Georgia, and Des Moines, Iowa, metropolitan areas, and Whatcom County, Washington -- followed by consideration of four basic rescue systems. Each of the four systems is capable of being adjusted from a low level of readiness to a state of full mobilization, and each is related to appropriate budget levels.

Here is how the analysis was conducted:

* Civil Defense Rescue Requirements Following a Nuclear Attack, working paper, SRI Project IMU-4727, February, 1965.

Damage to the three study areas from the two hypothetical attacks was assessed, providing figures and locations on those people who were uninjured, lighty injured, walking injured, non-walking injured, and trapped in debris. Fire and fallout patterns were analyzed to determine time requirements for rescue.

After operational and organizational criteria were identified, available resources were assessed and an estimate of the nation's need for rescue workers was prepared.

A single, basic system concept which would satisfy the criteria was developed. Within this concept, the four alternate organization and equipment plans were developed, each with the capability of advancing to a state of operational readiness during periods of increased international tension.

The basic operational concept then was assessed for its value against varying attacks and weapons effects, and in cities of varying sizes. The alternative systems were evaluated for rescue utility and relative cost-effectiveness.

In the course of analysis, alternate approaches lying outside the scope of the current study also were identified and considered for their possible use to OCD.

Finally, a logical sequence of decisions required of OCD was prepared and recommendations were made.

II PROBLEM DEFINITION

Before a civil defense rescue system can be developed, both the environment after nuclear attack and the rescue problem must be defined.

There are many important factors which would determine whether all the initial survivors would live. In the absence of extraordinary civil defense measures, widespread fires caused by thermal radiation and blast, and movement-prohibiting fallout, would probably account for many more deaths than blast itself. In addition, the seriously injured who survive these hazards would require immediate, effective medical care.

One important question is: how much time is available for rescue work? At least three factors will restrict available time: fire, fallout, and medical care.

Fire

Since a liberal estimate of fire damage could pre-empt rescue activities because of the absence of survivors, a conservative thermonuclear fire picture was used in the damage assessment.

The principal attacks analyzed called for direct hits on Atlanta and Des Moines with the general fire perimeter in predominantly residential areas.

The fire picture was one of growth and a combining of primary and

secondary ignition into a mass fire. Isolated single or small groups of structures could be expected to remain unburned, leaving small, scattered sites where post-fire rescue operations could be conducted.

Fallout

The case for rescue after the arrival of lethal fallout does not look promising.

Fallout from surface bursts would be expected in a matter of minutes around and over areas downwind from the detonations. The general area around the detonation point for both surface and air bursts probably would receive fallout from other upwind detonations in a few hours. In each case, fallout would pose a problem to both survivors and rescue workers.

Whereas rescuers could take shelter and avoid dangerous fallout, survivors trapped in light residential debris (whose protection factors measure from zero to 10) would probably receive lethal doses.

Medical Care

Prompt medical attention to injuries would be necessary for most of the seriously injured. One estimate indicates that 50 percent of the seriously injured would die from shock if treatment were not begun within five or six hours.*

* Davis, L. Wayne, et.al., Prediction of Urban Casualties From the Immediate Effects of a Nuclear Attack, the Dikewood Corporation, April, 1963.

Release From Debris

The number of man-hours required to complete a rescue depends upon the type of debris, the equipment available, the size of the rescue team, the complications of the search process, and the amount of foot travel required. For individual rescue tasks, the man-hours required would be highly variable.

Before the actual rescue work can start, those who are trapped must be located. Persons located in light debris should be able to hear rescuers and make their whereabouts known. Ten minutes seems to be a reasonable average search time for the majority of rescues.

Experience shows that a large number of trapped persons could be released in a fairly short time. A single rescue might release more than one person. For the specific cases analyzed in this report, an average of two man-hours per person rescued is used.

Other Considerations

Other factors must be considered in the development of a rescue system if it is to be a "people-saving" system. Within the previously defined operational rescue area, there are other large groups of survivors which must be saved. An approximate breakdown of the population within the operational rescue area is:

Population Group	Percent
Killed Immediately	2
Trapped	3
Non-ambulatory seriously injured	6
Ambulatory seriously injured	7
Lightly injured	41
Uninjured	41
Total	100

Of these people, 89 percent could walk. Up to 55 percent of this group would be children or elders. Their movement should be of first consideration in any emergency operating system. Any rescue operation would have to move against and among this tremendous outward movement of refugees.

Some of the able-bodied, uninjured male survivors who would be fleeing the fire area could be used for rescue activities. This group would probably be no greater than nine percent of the fleeing population.

Many on-the-spot decisions would have to be made as to who should be rescued. Since there would be about twice as many non-walking injured as trapped persons, special measures might have to be taken if manpower were insufficient. It might be better, for instance, to release those who could walk rather than to carry the non-walking victims to the vehicle line (3 psi peak pressure).

III OPERATIONAL REQUIREMENTS

The study developed the following operational requirements:

General

Since the first post-attack assembly point of the populace would be in shelter, a rescue force would have to move directly to their task from shelter. In areas where few shelters exist outside the central area of the city, other less effective assembly points would have to be used.

A minimum of key personnel should be preassigned to specific shelters.

Rescue fire analysis shows a sizable portion of the problem to be fire spread. If fire containment were critical, fire-fighting would have to be employed.

A medical service would have to be available to treat and transport the injured who had been rescued. The size and structure of the rescue force would be strongly affected by the capability of the medical service.

For the principal rescue work required -- that of immediate rescue -- little or no training seems needed for anyone except team leaders. They should have basic training to prepare them in providing leadership, understanding priorities and making tactical decisions. They should learn first aid, how to move the injured, how to search through debris areas, and the rudiments of light debris removal.

Re-entry rescue training should include basic knowledge of rescue tools, powered equipment, heavy debris removal, and the fallout environment.

The utility, character and need for a rescue capability would vary between cities. Federal guidance and federal programming should be flexible and allow options at the local level.

Because of the potential overwhelming rescue requirements of some communities and the possibility of no requirement in others, a local rescue system should provide for intercity mutual support. This support should be oriented to re-entry rescue and should be self-sufficient upon arrival.

A major portion of any rescue force should be preassigned to locations where it could support the immediate rescue task.

Organizational Requirements

Although the planning and management of rescue must be handled by an agency of the local government, rescue manpower requirements are greater than can be allocated from the ranks of city employees. The basic working manpower must therefore be derived from the general population.

The magnitude of the rescue task appears to be so great that it does not seem practical to create and maintain a standing rescue force large enough to cope with the potential demand. It would appear mandatory, to maintain rescue system costs at a reasonable level, to provide a hard core rescue force that could be a basis for rapid expansion of manpower during

crisis periods and after attack.

There is no city governmental department, including the fire department, that has adequate post-attack resources for rescue. Nor are there organizations in the public sector which have a similar or closely related mission. Where public organizations have accepted a rescue responsibility, their interest and capability have waned since they must train for missions that seemingly never occur.

The principal organizational problem is to find a way to maintain a rescue capability over a long time period without the inherent decay that comes with inactivity.

Resources

Considering the nature and magnitude of the rescue task, the potential resource in almost every requirement area is greater than the need. Persons trained in rescue or with closely related skills far exceed the leadership requirement. The equipment required for immediate rescue is readily available and could be distributed during a period of crisis. Many of the required rescue trucks are on hand. The remainder can be developed quickly from local sources. Existing training facilities are minimal but can be easily expanded to a reasonable level.

The national resources which would be important to the building of a rescue system capability are:

Trained Personnel

More than 250,000 persons in the nation have had at least 32 hours of rescue training by state and local governments since 1960. There are approximately 1,300,000 volunteer firemen throughout the country who have had varying degrees of rescue training. It is estimated that the American Legion has approximately 200 active Light Duty Rescue Teams. Skilled construction workers number in excess of four million. All persons with military experience have received training which will assist them in performing rescue.

Despite this large pool of actual and potential rescue team leaders, poor distribution throughout the nation would leave some areas of need in short supply.

Rescue Support Equipment

There are in the nation approximately 5,900 trucks specifically equipped for rescue service. The backlog of available trucks in all areas of the country which could be quickly converted to serve as mobile storage for rescue equipment is far in excess of any need. Rescue equipment for these trucks could probably be taken from present inventories, but it would be desirable to provide a uniform product, packaged for storage. Equipment items needed for heavy duty rescue are presently available in the stocks of municipalities and private contractors. Agreements would be needed to

requisition these stocks during crisis periods.

Facilities

Training facilities are adequate for the nation, even though they are not as widely distributed as desired. The present training facilities provide a basis which could easily be expanded to any level of need.

Base of Operations

Public shelters provide an ideal base of operations for the rescue groups. If shelters were not available, rescue groups would have to be based elsewhere.

Magnitude of a National Rescue Force

Applying percentages derived from this study to the total 1960 population of the 213 urbanized areas (95.8 million) the total number of persons trapped in a rescuable environment would be approximately 500,000.

The immediate rescue phase would dictate the size of the rescue force. Working within the time limitation of 30 minutes to four hours and including time for the rescue worker to reach the rescue site, locate the trapped, perform the release, and evacuate, it would seem that there would be considerably more rescuers than victims. The ratio of two rescuers to each rescuee is used in this evaluation, resulting in the need for an estimated 1,000,000 man national rescue force. This assumes

that the definition of rescue is restricted to rescue from debris, and that care for and evacuation of the injured is left to others.

IV SYSTEM CONCEPTS

The rescue concept which emerges from the operational requirements is one of a large number of relatively unskilled persons moving immediately from shelter to begin rescue work. This operation would be controlled through Emergency Operating Center communication lines to shelters. Equipment needs are minor. If this type of organization were planned and provided for in advance, it would be feasible to recruit, indoctrinate and equip the greater part of the rescue force during the crisis preceeding an attack.

The disadvantage of untrained volunteers would be minimized if the leadership were trained in rescue. A requirement for trained leadership presupposes a permanent cadre type of rescue organization which could also operate during natural disasters.

Characteristics

Here are the significant characteristics of the basic system:

Plans and Procedures

Advance planning is the key ingredient to organized effective action during the crisis. Procedures would become more detailed as the rescue workers' training increased.

Direction and Control

Control must include assigning rescue mission priority, recalling rescue forces if necessary and directing teams away from areas made unsafe by fire and fallout. Direction and Control at the EOC level is assumed in all planned systems.

Sector Leader

A sector or division leader should be in command of a sector of activities, translating EOC commands into operations. He should have a thorough knowledge of the rescue system planning, the probable post-attack environment, the community's physical arrangement, and the CD command structure. A public service department, such as the fire service, or a cadre of trained rescue specialists would have individuals with these qualifications.

Team Leader

Any post-attack rescue system containing a pre-crisis operational readiness would be built around a group with specific or rescue-related training, which would provide the leadership. This group could be composed of fire service and police department auxiliaries, industrial disaster teams, functioning American Legion Light Duty Rescue teams, community rescue services, or other parent organizations. In a crisis, other leaders with related skills would be recruited.

Team Member

Primary requirements for a rescueman are physical stamina, emotional stability, and the ability to work with his hands and simple tools. He should be identified as a rescueman during a crisis buildup and be given a maximum amount of indoctrination in rescue techniques and the probable post-attack environment. Principal source would be volunteers motivated during the initial crisis period. Another source would be the non-cadre members of cadre organizations such as the American Legion.

Assignment

If cadre and volunteers have been recruited before an attack, they should be given advance assignments to suburban shelter areas or other assembly points.

Equipment Support

Immediate rescue can be performed without any equipment if necessary. If possible, however, rescuemen should be issued a hard hat, gloves, flashlight, arm band and belt for carrying general-purpose tools. These items could be packaged on a team basis and deposited in fallout shelters during the crisis.

It would also be desirable for each rescue team to have a more elaborate assortment of hand tools plus portable equipment, organized

for two-man back-pack carry.

In addition to existing CD Rescue trucks, a variety of "expedient trucks" such as commercial vehicles could be used.

Heavy duty equipment could be obtained from local contractors, rental firms or city inventory at the onset of the crisis.

Four Alternate Systems

These are the four systems which conform to the basic concept:

1. Crisis Activated

This system would exist only on paper until a national crisis appears very likely. Detailed planning would be completed, however, for each populated area designated for a rescue force. Facilities for assembly and indoctrination would be arranged, and key leaders identified and briefed. Individuals with rescue or rescue-related background would be selected to provide the necessary indoctrination. The force could then be created during the crisis buildup by the addition of people, equipment, and indoctrination materials.

Initial action during the crisis would be procurement of team kits followed by mobilization of volunteers. Rapid production and distribution of rescue equipment and indoctrination materials on a pre-arranged basis would be started during the onset of the crisis. This material is simple enough to permit manufacture and nationwide distribution within 30 days

or less. If the crisis tension continued to grow, the rescue force would be mobilized.

Operational direction and control of this system could probably be exercised through the city fire department.

Sector Leaders would be drawn from city employees or auxiliaries who have a peacetime rescue role and individuals with similar roles in private companies, such as construction foremen. Rescue team or unit leaders would be selected on the basis of related experience and apparent fitness for the task.

A general indoctrination course would be given each rescue worker supplemented by instruction in the use of the equipment and simulated rescue drill. Supplementary training would be continued until the people were directed to shelter or until the crisis had subsided.

This system could operate most effectively from fallout shelters, since team organization would probably not be completed until the in-shelter period. Where sufficient shelter is not available, volunteer units could assemble after the attack at other locations.

2. Unpaid Cadre

This system calls for an unpaid cadre, which provides a better base for expansion in an emergency and give a minimum capability for peacetime rescue.

Cadre members would likely come from rescue-related employment, industry safety-rescue teams, or be members of a national organization chartered to provide community rescue teams. Leadership would be drawn from related city services or auxiliary organizations.

Expansion of this alternative system, procurement of materials and mobilization techniques would be the same as for the first alternative system except that fewer volunteers would be required. The cadre would assist with the indoctrination of the volunteers and the team organization for subsequent assignment to shelter.

The preferred operating base for all cadre-oriented systems would be the fallout shelter, mainly because of its communications link to the EOC, and the comparative ease of equipment distribution. Until there are adequate shelter spaces, however, selected rescue forces should be located in the periphery areas, in the most suitable shelter available.

In addition to immediate rescue kits, each functioning cadre organization should have light duty rescue equipment. A minimum would be the back packs. More extensive equipment would probably be added by local communities.

Rescue trucks are common to many communities. Others would probably decide to use existing city equipment or lease what was needed when the crisis buildup started. This concept of the "expedient" rescue

truck appears most suitable since it postpones expenses until the time of need. Much of the rescue equipment needed for these trucks could be selected in advance from city stocks and tagged for a mobilization assignment.

2a. Optional Unpaid Cadre

This option would give the unpaid cadre system an increased effectiveness in dealing with natural disaster.

A paid staff of approximately 30 persons, operating nationwide through a national peacetime, disaster-oriented organization, could apply the peacetime rescue force in any natural disaster situation to the extent required. This group would provide expert rescue direction and support the local CD agencies with outside assistance as needed.

Permanent rescue trucks are primarily for equipment storage and transportation. Cadremen would be transported by other means. With this restriction, it is felt that a minimum of two trucks equipped for natural disaster rescue should be supplied to each peacetime cadre group of 200 (or one truck per 100 cadremen).

3. Mixed Cadre

This system upgrades the unpaid cadre concepts by replacing half the unpaid cadre members with paid cadre members. A paid cadre provides a professional, on-call rescue capability which could be readily

deployed in a natural disaster.

Training time would be paid. Members would train for a minimum of 32 hours the first year and 16 hours thereafter. The paid cadre could assume major responsibilities for the entire rescue force effort, and fill all higher leadership positions.

In addition to team rescue kits, light rescue back packs and the expedient rescue trucks recommended for the other systems, two permanent, natural-disaster-equipped rescue trucks per every 200 cadre members are recommended.

The budget associated with this system contemplates purchase of equipment during the building phase, as opposed to previous systems which defer this material until the crisis.

4. Paid Cadre

This system is a further upgrading of the unpaid and mixed cadre systems by providing a wholly paid cadre which would amount to 20 percent of the post-attack rescue force. It would cost more but would show a corresponding increase in overall effectiveness. It would provide a paid, trained leader in each position of responsibility.

This system would provide a potent rescue force in readiness for any peacetime disaster. The depth of trained leadership would give it considerable tactical flexibility. With a trained leader available to every

four volunteers, the volunteers would be more responsive to command and control and would have increased effectiveness.

The same number of permanent rescue trucks for natural disaster would apply; namely, two for each 200 cadremen. All volunteer equipment would be purchased and stored in advance of need.

V. EVALUATION OF SYSTEMS

Assuming there is a nuclear detonation within an urban area, the need for a rescue function appears to depend on four elements:

1. Expectancy of a nationwide fallout threat or further detonations. If neither of these threats is expected within four hours, the immediate rescue phase might be practical. If there is not an adequate supply of surviving shelters, the remaining time before fallout might be better spent in developing expedient shelters.

2. Surface versus air burst. For a surface burst, neither immediate nor re-entry rescue could be conducted on the downwind sector, due to initial fallout. The upwind and crosswind sectors would, however, include substantial numbers of people needing rescue. An air burst should increase the rescue problem by extending the rescue areas further from ground zero.

3. Percentage of persons sheltered. The extent of the rescue task will depend upon how many people reach adequate shelter. Poorly sheltered persons are the most likely candidates for rescue.

4. Magnitude of casualties. Where the ratio of injured to uninjured survivors within the total urban population is high, rescue work would probably be pre-empted by the need to care for the injured.

Rescue System Candidate Cost Comparison

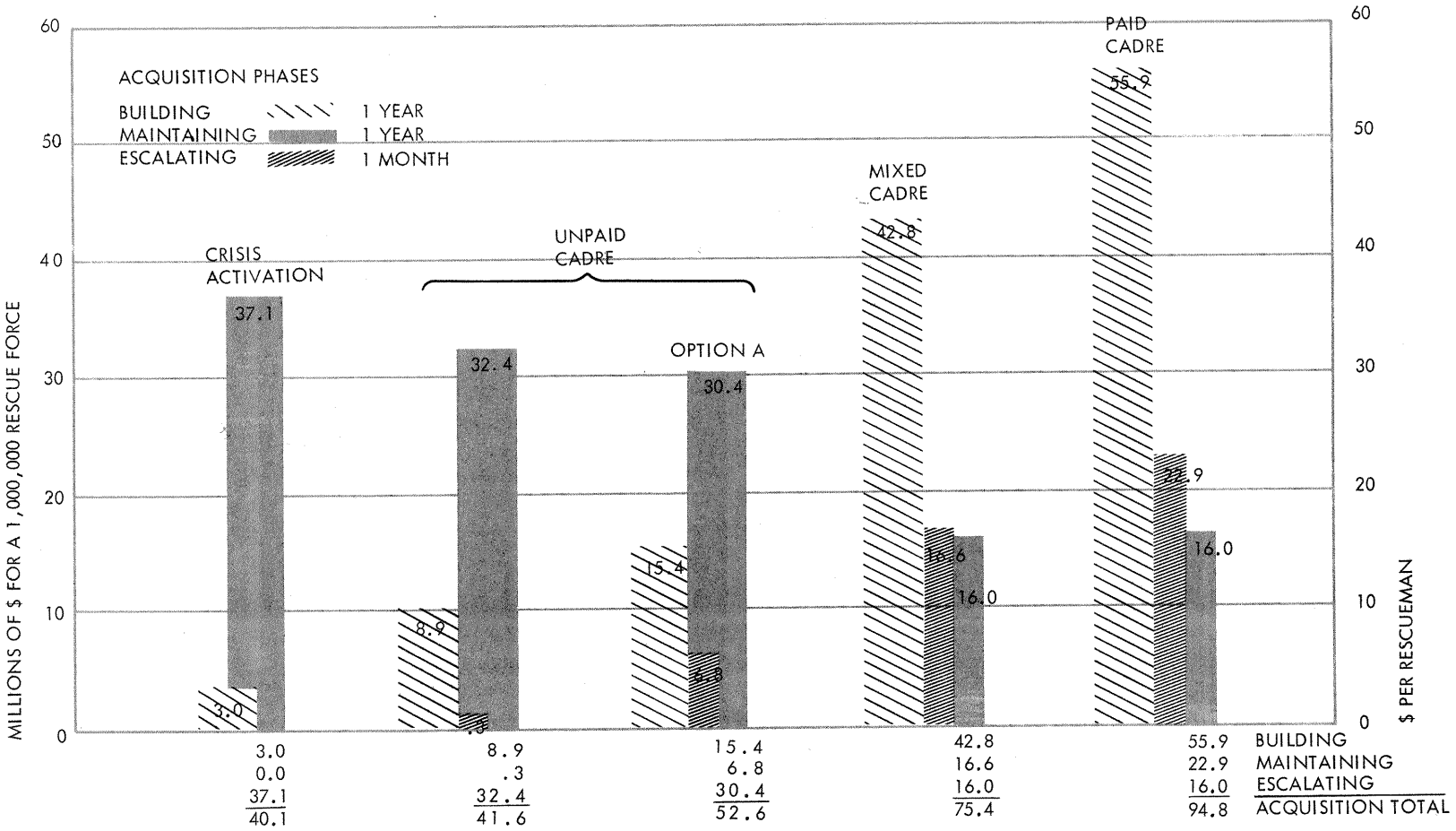
The results of the system cost estimates are shown on Page 25. General considerations which apply to cost accumulation against each of the candidates are discussed below.

1. Crisis Activation. This candidate system would have lowest cost during building and no maintenance cost. It would be highest during escalation. Building costs would be limited to detailed master planning. The other costs would occur during escalation and consist of volunteer indoctrination, equipment, administration, and expedient rescue trucks.

2. Unpaid Cadre. This candidate has planning, equipment, and operating expense including nationwide coordination during the building phase. Training and coordination expense are incurred during the maintenance period. In common with (1), the bulk of the total acquisition costs occur during escalation.

3. Mixed Cadre. The substitution of one-half of the unpaid cadre with a paid cadre reflects increased costs in planning, training, facilities (group headquarters), and operating expense during the building phase. Also, two rescue trucks are provided at the start. Training, facilities, and operating expense also occur during the maintenance phase. Escalation costs are minimal, being confined to indoctrination and

RESCUE SYSTEM CANDIDATES
Preliminary Cost Comparisons



Source : Stanford Research Institute

equipping of 800 volunteers and the leasing of eight light duty rescue trucks.

4. Paid Cadre. This candidate system imposes higher costs on those activities associated with additional paid cadre. Training costs, facilities and operating costs are the highest of all candidates during building and maintaining. Escalation costs, in common with candidate (3), are minimal.

Two Further Alternatives

There are two alternatives outside the basic system concept:

1. A General Disaster Force

If the rescue function were limited to rescue from debris, it is probable that the mission would be pre-empted or precluded for various attack situations. If a large force is to be created, it might therefore be appropriate to give it a broad flexible responsibility so that it would be useful regardless of attack circumstances.

In this analysis, a central fact has emerged; the major emergency work task would be the total problem of rapid evacuation of all survivors (uninjured, walking injured, non-walking injured and trapped) from the fire area. The activities of rescue, control of evacuation, and transporting and attending the wounded seem so interwoven that they could be easily incorporated into a single broad mission. Broader skills would, furthermore,

allow the organization to operate more effectively in natural disasters.

The cadre component of the second, third, and fourth alternative systems represent an organized, self-sufficient unit, mobile enough to move to distant communities and perform a broad variety of tasks. The cost would be higher but its services would be greater.

2. The Military Reserve

The present ground rule that the military can only plan a supportive role has required that all proposed systems be independent of such support.

This ground rule appears valid only if military units, including reserves, are scheduled for mobilization and deployment during the first days of a nuclear war. Otherwise, the military could take on the primary responsibility for rescue and related tasks, at least through the initial post-attack period.

There would be many advantages in using military reserves for rescue. For example, they are a trained, organized force directly responsible to the Federal and state governments. They have much of the required equipment, and are deployed by organizational units in the geographical areas of need -- the urban centers. They have headquarters facilities, training capability and the necessary direction and control.

VI CONCLUSIONS & RECOMMENDATIONS

The rescue problem is marked by great variability. Under a nuclear attack, a planned rescue service might be overwhelmed by its rescue requirements or find it unrealistic or unnecessary to carry out its assigned mission. There are several conditions in which rescue might be precluded. For example, a rescue force might be given higher priority, non-rescue tasks such as evacuating the non-trapped injured. Fire and/or fallout might prevent rescue, or nationwide fallout could prevent movement of rescue forces to needy areas.

Under almost every other condition however, an effective rescue force could be a most valuable asset to an effective emergency operating system.

Size of the Problem

The magnitude of the total rescue problem has been defined as the expected number of survivors trapped under given conditions. This figure would be greatest where a large weapon or weapons were detonated upon a city center. Assuming the weapon was large enough to extend its effects into the suburbs, approximately half of one percent of the metropolitan population might be trapped in areas where rescue might be feasible. These people must be rescued prior to fire spread and arrival

of lethal fallout, approximately three hours after detonation. After the fire subsides and if nationwide fallout permits, a few additional survivors may be found in unburned areas.

Timed Constraints

A major finding of EOSD analysis and of previous rescue research concerns the limited time available for rescue. Fire analysis indicates that a majority of trapped persons would be endangered by fire within a few hours. Time limitations posed by fallout could range from a few minutes to several hours. A third time problem is posed by the medical needs of those who are trapped and seriously injured. These survivors could enter a state of irreversible shock if they are not rescued and treated within a few hours.

There are two time periods when rescue can occur. One is during the first few hours after attack; depending on the fallout situation, this period might last only minutes. The second period is after the fire cools and fallout decays. Between these two periods, there probably would be a period of seven to 18 hours when the general heat level would preclude any activity within the fire area.

Immediate Rescue

These factors suggest that one part of a rescue service must react within the first few hours after attack. Since the location of rescue sites

would be within the debris area and debris clearance could not be conducted in a short time, the immediate rescue response would have to be made without vehicles and with only hand-carried equipment. Since it is possible to move through debris on foot at the rate of only one to one and a half miles per hour, the rescue force must be at or near the rescue site at the time of attack. Therefore, immediate rescue teams must:

1. Be shelter-based.
2. Move directly to rescue sites.
3. Operate with minimum equipment.
4. Effect those rescues which can be completed within an hour.

Studies of World War II British rescue work demonstrates that many rescues can be effected within 30 minutes.

Re-Entry Rescue

Later rescue work, termed re-entry rescue, would be similar to the current civil defense rescue for heavy duty rescue training. Heavier equipment would be used; large complements of rescue forces, debris clearance operations, medical personnel and medical and rescue vehicles would be brought to the remaining rescue sites.

Several facts about re-entry rescue should be highlighted. Rescue sites might be few and clustered in scattered, small unburned areas; they would be the remains of structurally weak buildings rather than the heavy

frame buildings used for public shelters. Structural failure of heavy frame buildings occurs only at high pressure levels and these failures would be too deep within the fire area for rescue teams to reach. It is not likely that re-entry rescue workers would be releasing large numbers of trapped persons from public shelters.

System Development

The basic rescue system concept is founded upon a cadre of trained leaders, minimal hand-carried equipment for immediate rescue, and rapid recruitment of untrained volunteer rescue workers during the crisis buildup and after the attack.

While existing analyses are not sufficient to determine accurately an appropriate size of a national rescue force, it might be estimated at one million men (cadre plus volunteers).

Of the four proposed alternative systems within the basic concept, two could be accommodated by the current OCD budget.

The first system requires no training or equipment issuance prior to a call to active duty. It would be activated only during a national crisis. Excluding the expenditures which would be involved in expansion of the system, it would cost approximately $3 million to build. The annual maintenance cost would be negligible.

The second system requires a hard-core, unpaid, trained cadre of

200,000 men during peacetime, thus providing a capability for natural disaster rescue. By absorbing volunteers, it could be expanded to one million men in times of need. Excluding crisis escalation costs, this system would require approximately $10 million to build and $1 million per year to maintain.

The third and fourth systems are variations of the second system, but require larger budgets than current OCD levels. Greater preparedness and reliability would be obtained by including paid cadre personnel.

Under any of these systems, the major impact would be a new orientation toward rescue by civil defense personnel and additional requirements on shelter management.

OCD Decision Making

The transition of the EOSD rescue study from Phase I to Phase II requires these decisions by OCD:

1. Reevaluation of the Use of Military Forces

If the argument for the use of the military is valid, a major redirection of both EOSD and military planning is required.

2. Broader Definition of Rescue

If the military is to remain in a supportive role, a decision should then be made concerning the present role of rescue relative to roles of other EOSD tasks.

3. Selection of Candidate System

If the first two decisions are negative, OCD must select one of the four proposed alternative systems or establish new ground rules for development of still another system. Another could be developed from the best ingredients of the several proposed systems, for example, and adapted to a specific budget.

Recommendations

These are the recommendations of the study group:

1. It is recommended that the military role in rescue be reevaluated for redirection in keeping with this analysis. This reevaluation may be assisted by presentation of the rescue and fire evacuation problem to the Army. If the presentation triggers reevaluation studies within the Army, such studies should be coordinated with further EOSD effort.

2. If the military role is not reevaluated, it is recommended that the role of the rescue task be broadened to embrace all post-attack "people saving" tasks. These tasks should be put on a common schedule and reported on, as a single coordinated system or systems. The study should lead toward a national general disaster force with a broad role in both nuclear war and natural disaster.

3. If neither previous recommendation is accepted, it is recommended that the choice between the first and second systems be made on the basis of civil defense interest in higher participation in natural disasters. The

optional Unpaid Cadre system would provide 200,000 trained cadre, fully equipped and mobile, to converge upon natural disaster areas. Such organized groups are presently needed in coping with disaster conditions. Natural disaster identification will offset the erosion of capability which comes from lack of use.

If a broader role in natural disasters is not desirable, the first alternative system is recommended. Its low level of preparedness is justified by its low cost.